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Reg. No.

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III Semester M.Sc. Degree Examination, March/April - 2025

CHEMISTRY

Organic Reaction Mechanisms
(CBCS Scheme 2019-2020 Onwards)

Paper : Ch-301 OC



Time : 3 Hours

Maximum Marks : 70

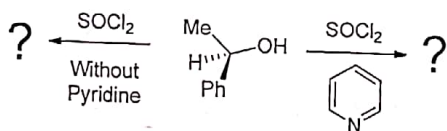
Instructions to Candidates:

Answer question No. 1 and any Five of the remaining questions.

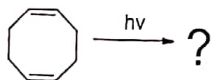
Answer any Ten of the following questions.

(10×2=20)

1. a) Give any one generation of carbene and an example for insertion reaction.
b) Predict the products for the following reactions:

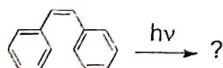


- c) Propose the mechanism for $A_{AC}2$ hydrolysis of esters.
d) Predict the products with suitable mechanism for the following reaction.

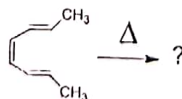


- e) Give the energy level diagram of ground state triplet oxygen.
f) Outline the mechanism involved in the benzil sensitized cyclization of S-cis-1,3-butadiene.
g) Provide an example for [2+2]-cycloaddition reaction.
h) Explain briefly the Nazarov cyclization reaction with suitable example.
i) Complete the following ring closure reactions:

(i)



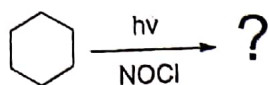
(ii)



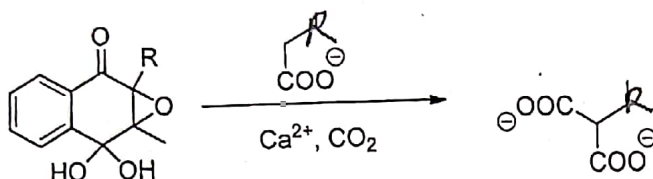
[P.T.O.]



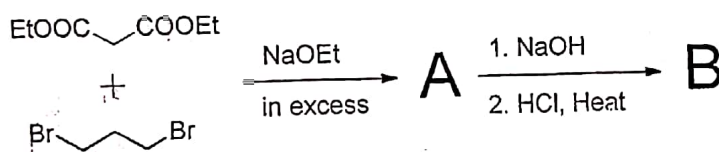
- j) Explain briefly SOMO with suitable energy level diagram.
k) Predict the product with suitable mechanism for the followings.



- l) Give the suitable mechanism for the following conversion:



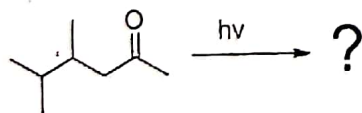
2. a) Write a note on the following reactions:
i. Haloform reaction. ii. Haller-Bauer reaction.
b) Distinguish mechanistically S_E1 and S_E2 reactions.
c) Predict the products with suitable mechanisms for the following:



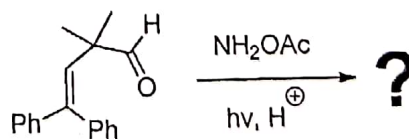
3. a) Predict the products with suitable mechanisms for the following:

(4+3+3)

(i)



(ii)



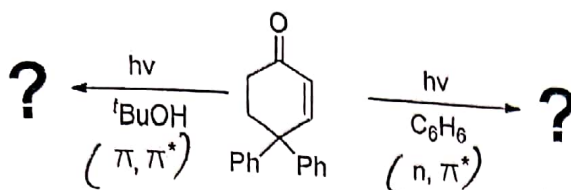
- b) Discuss the Paterno-Buchi reaction with an example.



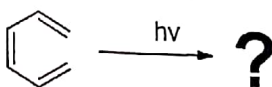
(3)

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- c) Propose the products with suitable mechanisms for the following reaction:



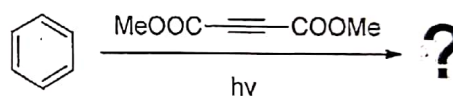
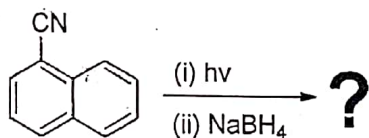
4. a) i. Describe valence isomerization of benzene under photo irradiation. (4+3+3)
 ii. Predict the products and propose the mechanism for the following reaction.



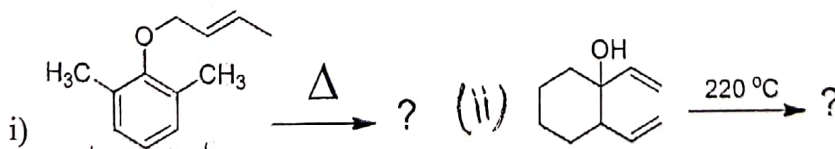
- b) Discuss the Backstrom and Foote's photochemical oxidation reaction.
 c) Formulate the products for the following reactions:

(i)

(ii)



5. a) Deduce the selection rules by PMO method for $(4n+2)\pi$ electrocyclic reactions. (4+3+3)
 b) Illustrate linear and non-linear approaches in cheletropic reactions.
 c) Discuss the sigmatropic shift of pentadienyl radical using FMO theory. (4+3+3)
 6. a) Predict the products for the following reactions with mechanism:



- b) Explain the endoselectivity in Diels-Alder reaction.

[P.T.O.]

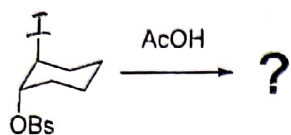


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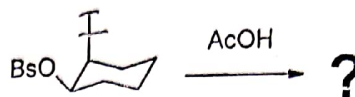
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- c) Discuss Neighboring group participation in the following compounds and mention which isomer undergoes faster acetolysis?

(i)

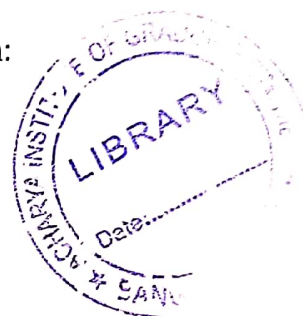
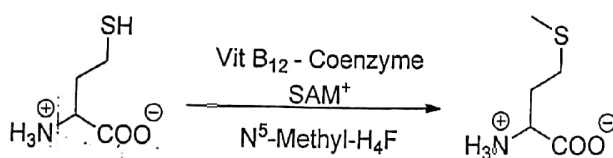


(ii)



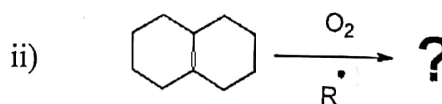
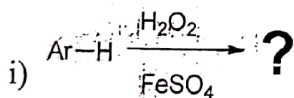
(4+3+3)

7. a) Discuss the mechanism involved in the β -elimination of Threonine by Pyridoxal Phosphate (PLP).
b) Illustrate the mechanism involved in the conversion of Oxaloacetate to citrate in the presence of Co-enzyme-A (CoASH).
c) Propose suitable mechanism for the following conversion:



(4+3+3)

8. a) Discuss the following reactions with an example for each:
i. Hunsdiecker reaction ii. Gomberg-Bachmann reaction.
b) Predict the products for the following reactions:



(6+4)